UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/776,080	02/01/2001	Wei-Lien Hsu	5500-60900	9437

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B. Noel kivlin
Conley, Rose & Tayon, P.C.
P.O. Box 398
Austin, TX 78767-0398

EXAMINER
DO, CHAT C

ART UNIT	PAPER NUMBER
2124	

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

<table>
<tr><td rowspan="2">Office Action Summary</td><td>Application No.
09/776,080</td><td>Applicant(s)
HSU ET AL.</td></tr>
<tr><td>Examiner
Chat C. Do</td><td>Art Unit
2124</td></tr>
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-12 and 14-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-12 and 14-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is responsive to Amendment B, filed 03/12/2004.

2.   Claims 1-3, 5-12, 14-20 are pending in this application. Claims 1, 11, and 16-20 are

independent claims. In Amendment B, claims 4 and 13 are cancelled and claim 20 is added.

This action is made non-final.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed
> in the United States before the invention by the applicant for patent or (2) a patent granted on an application for
> patent by another filed in the United States before the invention by the applicant for patent, except that an
> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this
> subsection of an application filed in the United States only if the international application designated the United
> States and was published under Article 21(2) of such treaty in the English language.

4.   Claims 1, 5, and 16-17 are rejected under 35 U.S.C. 102(e) as being anticipated by

Horton (U.S. 6,421,696).

        Re claim 1, Horton discloses in Figure 3 and 8 a method of performing a two

dimensional discrete cosine transform "DCT" using a microprocessor having an

instruction set that includes SIMD floating point instructions (abstract and col. 3 lines 24-

30), wherein the method comprises: receiving a block of integer data having C columns

and R rows (col. 1 lines 57-58 and col. 1 lines 36-42 wherein the frame is a two

dimensional data), wherein each of the R rows contains C row data values, wherein the

block of integer data is indicative of a portion of an image (col. 1 lines 36-42); and for

each row, loading the C row data values of the row into registers (Figure 6 and col. 2

lines 44-50); converting the C row data values into floating point form (col. 4 lines 60-

65), wherein the registers each hold two floating point row data values ({Re(0): Re(1)},

{Re(2):Re(3)},... in Figure 6); and performing a plurality of weighted-rotation operations

on the values in the registers (Figure 10), wherein the weighted-rotation operations are

performed using SIMD floating point instructions (col. 5 lines 1-6 and lines 28-34);

altering the arrangement of values in the registers; performing a second plurality of

weighted-rotation operations on the values in the registers; again altering the arrangement

of the values in the registers; performing a third plurality of weighted-rotation operations

on the values in the registers; yet again altering the arrangement of the values in the

registers; and performing a fourth plurality of weighted-rotation operations on the values

in the registers to obtain intermediate floating point values (depending on the number of

input data, more stages are repeated as seen in Figure 10 and Figure 1).

Re claim 5, Horton further discloses in Figure 3 and 8 for each row, storing the

intermediate floating point values to an intermediate buffer (Figure 6 and col. 6 lines 33-

35).

Re claim 16, it is a computer system claim of claim 1. Thus, claim 16 is also

rejected under the same rationale in the rejection of rejected claim 1.

Re claim 17, it is a carrier medium comprising software instruction claim of claim

1. Thus, claim 17 is also rejected under the same rationale in the rejection of rejected

claim 1.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

6.   Claims 2-3 are rejected under 35 U.S.C. 103(a) as being obvious over Horton (U.S.

6,421,696) in view of Advanced Micro Devices Inc. ("AMD Extensions to the 3Dnow!™ and

MMX ™ Instructions Sets Manual"). ·

Re claim 2, Horton discloses in Figure 10 a DCT operation in floating point

format. Horton does not disclose a converting is accomplished using the pi2fw

instruction. However, Advanced Micro Devices Inc. discloses in page 2 Table 1 the

functionality of pi2fw instruction in multimedia operations. Therefore, it would have

been obvious to a person having ordinary skill in the art at the time the invention is made

to add the pi2fw instruction in the Advanced Micro Devices Inc.'s manual into Horton's

invention for converting packed integer to floating point words because it would enable

to simplify the system software and improve the system performance.

Re claim 3, Horton discloses in Figure 10 weighted-rotation operations are

accomplished using the swap operation, multiply operation (with weight), and

accumulate operation in floating point format. Horton does not disclose weighted-

rotation operations are accomplished using the pswap, pfmul, and pfpnacc instructions.

However, Advanced Micro Devices Inc. discloses in page 2 Table 1 the the pswap,

pfmul, and pfpnacc instructions for used in the swap operation, multiply operation (with

weight), and accumulate operation in floating point format. Therefore, it would have

been obvious to a person having ordinary skill in the art at the time the invention is made

to add the pswap, pfmul, pfpnacc instructions as seen in the Advanced Micro Devices

Inc's manual into Horton's invention for performing the DCT operations because it

would enable to simplify the system software and improve the system performance.

7.   Claims 6-12, 14-15, and 18-20 are rejected under 35 U.S.C. 103(a) as being obvious over

Horton (U.S. 6,421,696) in view of Hung et al. ("Statistical Inverse Discrete Cosine Transforms

for Image Compression").

        Re claim 6, Horton does not disclose a second dimensional DCT comprising for

two columns at a time, loading data from two columns of intermediate data into each of a

plurality of registers; performing a plurality of weighted-rotation operations for two

columns are performed in parallel using SIMD floating point instructions. However,

Hung et al. disclose in Figure 2 a second dimensional DCT (column operations)

comprising for two columns at a time (e.g. even and odd), loading data from two columns

of intermediate data into each of a plurality of registers; performing a plurality of

weighted-rotation operations for two columns are performed in parallel using SIMD

floating point instructions (Figure 4 discloses multiple columns of data are processed

instantaneously). Therefore, it would have been obvious to a person having ordinary skill

in the art at the time the invention is made to add a second dimensional DCT comprising

loading two columns at a time and performing a plurality of weighted-rotation operations

for those two columns as seen in Hung et al.'s invention into Horton's invention because

it would enable to increase the system performance in the second dimension DCT by

processing multiple columns at same time.

Re claim 7, it has similar limitations cited in claim 3. In addition, Horton in view

of Hung et al. do not disclose the pfsub and pfadd instructions. However, the examiner

takes an official notice that these instructions pfsub and pfadd are known in the art.

Therefore, it would have been obvious to a person having ordinary skill in the art at the

time the invention is made to add the pfsub and pfadd instructions into Horton's

invention for performing the DCT operations because it would enable to simplify the

system software and improve the system performance

Re claims 8-10, Horton further discloses for two columns at a time, as each

weighted-rotation operation is done, storing weighted-rotation operation results to the

intermediate buffer; for two columns at a time, retrieving weighted-rotation operation

results from the intermediate buffer; performing a second plurality of weighted-rotation

operations on the retrieved values; again storing weighted-rotation operation results to the

intermediate buffer as the weighted-rotation operations of the second plurality are done;

again retrieving weighted-rotation operation results from the intermediate buffer;

performing a third plurality of weighted-rotation operations on the retrieved values; yet

again storing weighted-rotation operation results to the intermediate buffer as the

weighted-rotation operations of the third plurality are done; yet again retrieving

weighted-rotation operation results from the intermediate buffer; performing a fourth

plurality of weighted-rotation operations on the retrieved values; converting the

weighted-rotation operation results from the fourth plurality to integer results; for two

columns at a time, writing the integer results to an output buffer (all features are seen in

Figures 1 and 10 for plurality of stages in second DCT and col. 4 lines 40-45).

Re claim 11, it has same limitations cited in claim 8. Thus, claim 11 is also

rejected under the same rationale in the rejection of rejected claim 8.

Re claim 12, it has same limitations cited in claim 7. Thus, claim 12 is also

rejected under the same rationale in the rejection of rejected claim 7.

Re claim 14, it has same limitations cited in claim 9. Thus, claim 14 is also

rejected under the same rationale in the rejection of rejected claim 9.

Re claim 15, it has same limitations cited in claim 10. Thus, claim 15 is also

rejected under the same rationale in the rejection of rejected claim 10.

Re claim 18, it is a computer system claim of claim 11. Thus, claim 18 is also

rejected under the same rationale in the rejection of rejected claim 11.

Re claim 19, it is a carrier medium comprising software instruction claim of claim

11. Thus, claim 19 is also rejected under the same rationale in the rejection of rejected

claim 11.

Re claim 20, it has same limitations cited in claim 6. Thus, claim 20 is also

rejected under the same rationale in the rejection of rejected claim 6.

Response to Arguments

8.   Applicant's arguments filed 03/12/2004 have been fully considered but they are not

persuasive.

a.   The applicant argues in page 11 for claim 1 second paragraph that the cited

reference does not teach the altering the arrangement of values in the registers three times

between performances of weighted-rotation operations.

The examiner respectfully submits that the cited reference clearly discloses in

Figure 1 a multiple stage (m = 3 in this case) FFT wherein at each stage, values in

the registers are changed accordingly.

b.   The applicant argues in page 11 for claim 1 last paragraph that the cited reference

does not teach the loading an entire row of data values into registers.

The examiner respectfully submits that the limitation "loading an entire row of

data values into registers" is not cited in the claim. Even the claim has the

limitation, the cited reference clearly discloses this limitation in Figure 1 wherein

a size of row is equal to 8 (x_0-x_7).

c.   The applicant argues in page 12 for claim 6 fourth paragraph that the cited

references in alone or combine do not disclose, teach, or suggest the limitations cited in

the claim.

The examiner respectfully submits that the rejection clearly states above. In

addition, the specification does not clearly disclose or explain the structure for

processing two columns at a time differ from the prior art using multiple set of

single processing column. For rejection, the examiner interprets claims with this

limitation "for two columns at a time" as additional set of single processing

column for reducing the processing time.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The

examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chat C. Do
Examiner
Art Unit 2124

May 24, 2004

KAKALI CHAKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100